Revision of the rugose coral *Diphyphyllum concinnum* Lonsdale, 1845 and historical remarks on Murchison's Russian coral collection.

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Synopsis

The type specimens of *Diphyphyllum concinnum* Lonsdale, 1845, which is also the type species of the important Carboniferous rugose coral genus *Diphyphyllum*, had been thought lost, but one has recently been found again, and is here redescribed. Comparison with recently erected neotypes suggests that they are only doubtfully conspecific. Remarks are given on the history of Murchison's Russian coral collections, which some authors had thought lost, and a list is given of those of his corals held in the British Museum (Natural History) collections.

Introduction

The objects of this note are to redescribe an important type specimen that has been found again, to correct the belief held by some other coral workers that Murchison's Russian corals described by Lonsdale are lost, and to give some historical background to these corals.

The type specimens of *Diphyphyllum concinnum* Lonsdale, 1845, collected by Sir Roderick Murchison from the Lower Carboniferous of the Urals, Russia (Murchison *et al.* 1845), are important because of the status of *D. concinnum* as the type species of the widespread Carboniferous rugose coral genus *Diphyphyllum*. Moreover, this genus has long been of additional problematic interest because there has always been uncertainty about its relation to the equally important genus *Lithostrotion*, with which it would seem to intergrade. In this respect the genus has therefore been the type example of the 'diphymorph' trend or condition (Smith & Lang 1930). The type specimens have been apparently missing for about half a century, but one was found again by one of us (R. F. W.) in 1972. Rediscovery provides an opportunity to give a new description and figures, rendered desirable by the need for a good transverse section and detailed confirmation of the description given originally by Lonsdale. We have done so here on the recommendation of Professor Dorothy Hill (University of Queensland, Australia). Redescription is now made additionally interesting by the recent designation of a neotype of *D. concinnum* from the type locality by Ivanovskiĭ & Shurÿgina (1975). Dr J. R. Nudds (Trinity College, Dublin) is currently preparing a detailed study of the genus and its relationship to other lithostrotionids.

The above Russian authors have stated (1975 : 14) that Murchison's Russian corals are lost, an impression which is presumably shared by some at least of other coral workers. This is only partly correct. We have found several other type specimens very recently as a result of checking carefully through material in our care, stimulated by this statement by Ivanovskiĭ & Shurÿgina. Others have never been lost at all. Several well-established taxonomic names were first used by Lonsdale for corals described by him in Murchison's collections, and a list of relevant material held by the British Museum (Natural History) is now desirable. A brief history of Murchison's coral collection is also appropriate. We are currently preparing redescriptions of other corals from Murchison's Russian travels held by the Museum.

All specimen numbers used here are register numbers of the Department of Palaeontology, British Museum (Natural History). In the remainder of this paper, the three institutions concerned

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will be referred to by their initials, MPG (Museum of Practical Geology), GSL (Geological Society of London) and the BM(NH).

It is a pleasure to acknowledge help from Dr Pierre Semenoff-Tian-Chansky (Institut de Paléontologie, Paris) on the coral terminology used by Ivanovskiĭ & Shurÿgina, and also from Dr John R. Nudds (Trinity College, Dublin); Mr R. J. Cleevely, BM(NH), has helped us on the historical matters. Dr G. F. Elliott, BM(NH), Dr Semenoff-Tian-Chansky and Dr J. Fedorowski (A. Mickiewicz's University, Poznań) kindly read the manuscript and offered helpful criticisms.

Historical note on Murchison's Russian corals

Murchison's Russian corals came to the BM(NH) by at least two routes. Some were presented by him to the MPG (which was, in effect, part of the Geological Survey and is now, as the Geological Museum, part of the Institute of Geological Sciences) of which Murchison was for a long time the Director. Others appear to have been presented to the collections of the GSL or otherwise found their way into these collections. In this connection Mr R. J. Cleevely, BM(NH), tells us that he knows of no Murchison donation of Russian material to the GSL, and has drawn our attention to the fact that Lonsdale was the Society's Curator and Librarian during the period 1829–42. All non-British material from both these large and important collections was later transferred to the BM(NH), the largest part of the material coming from these Institutions in 1880 and 1911 respectively. Woodward (1904 : 314) lists Murchison and Lonsdale in his entry for the MPG, and gives this 1880 date for the transfer to the BM(NH); see also p 231. Also on p. 314 there is an entry for Murchison, but the information given applies to material other than the present Urals corals. There was also a smaller transfer from the MPG to the BM(NH) in 1878 (R. J. Cleevely, personal communication).

The history of the transfer of the Geological Society collections is not summarized anywhere, and because of their historic interest and importance, this is now given here. In 1911 the GSL decided to relinquish its collections (Watts 1911*a*; 1911*b* : lx–lxii; GSL 1911*a*). British material was to be offered to the MPG, and 'foreign and colonial' material to the Trustees of the BM(NH) (GSL 1911*b*). Both institutions duly accepted and the collections were transferred (Watts 1912*a*; 1912*b*: lxix–lxxi). Teall (1913) reported on the transfer of the British fossil material and Woodward (1913) on the foreign fossil material. As Woodward explained, it was the intention not to incorporate any of the material received by the BM(NH) until 'the whole have been thoroughly curated, registered and studied'. This task was for some reason never completed, and the type of *D. concinnum* was found together with other material from the GSL, still unregistered. At various times, foreign specimens have been transferred from the Institute of Geological Sciences to the BM(NH). They were probably unintentionally sent to the MPG in the 1911 transfer, or were perhaps even left over from the 1880 transfer. Such reasons would account in part for the apparent loss of some of Murchison's Russian corals.

List of Lonsdale's corals from Murchison's Russian travels

The species below are listed in Lonsdale's original order using his names and quoting his specimen details, and giving his page and figure references. However, the species names themselves are given according to modern procedure. Species represented in the BM(NH) collections are shown by the listing of their specimen numbers; redescriptions are in preparation. Species not represented are preceded by an asterisk (*).

Although referred to as corals by Lonsdale, the following species discussed by him are now regarded as belonging to other groups; their details are not included here. *Stromatopora concentrica*, *Monticularia sternbergii*, *Stenopora spinigera*, *S. crassa*, *Fenestella infundibuliformis*, *F. retiformis ?*, *F. veneris ?*, *F. martis ?*.

Of the 30 coral species (excluding the above list) described by Lonsdale, the BM(NH) holds types, or figured or described specimens, of 19 (28 specimens). Four out of nine Silurian species

are represented and 15 out of 19 Carboniferous species. The remaining corals unrepresented are: Silurian/Devonian (one), Devonian (one), Devonian/Carboniferous (one), Permian (one). Of the ten species founded by Lonsdale, eight are represented. Three of these are type species of genera founded by Lonsdale in this same work and still recognized today. Two of these are represented.

1. **Syringopora parallela* Fischer. Lonsdale 1845 : 591–592. 'Perimishel, south of Kaluga; Vitegra, Ilinsk on the Tchussovaya: Carboniferous limestone. Odoyef near Lichvin: Upper Devonian.'

2. *Syringopora distans* (Fischer). Lonsdale 1845 : 592–593. 'Ilinsk, on the river Tchussovaya, west of the Ural Mountains. Carboniferous limestone.' Specimens: R35936–7 (described only).

3. **Catenipora labyrinthica* Goldfuss. Lonsdale 1845 : 593. 'Isle of Dago, Upper Silurian. Top of Lower Silurian, at Naissi, in Lithuania.'

4. *Chaetetes radians* Fischer. Lonsdale 1845 : 595–596; pl. A, figs 9, 9a. 'Kaluga, and Vitegra, Borovitchi near Valdai, Carboniferous limestone.' Specimen: 26356 (figs 9, ? 9a), Kaluga.

5. **Chaetetes dilatatus* Fischer. Lonsdale 1845 : 596. 'Borovitchi; Miatchkova. Carboniferous limestone.'

6. **Chaetetes petropolitanus* (Pander). Lonsdale 1845 : 596–597; pl. A, figs 10, 10a. 'Nikolsk to Petropavlosk [sic], on the river Volkof; banks of the Siass river; ravines of Pulkovka and Popovka, south of St. Petersburgh; plateau of Czarskoe-celo; sea cliffs from Narva to Reval. Lower Silurian.'

7. *Lithodendron costatum* sp. nov. Lonsdale 1845 : 598–599, text-figs a, b. 'Perimishel, south of Kaluga. Carboniferous limestone.' Specimen: R33575 (text-figs a, b).

8. *Lithodendron annulatum* sp. nov. Lonsdale 1845 : 599, pl. A, figs 5, 5a. 'River Issetz, east of Ekaterinburg; Ilinsk, on the Tchussovaya. Carboniferous limestone.' Specimens: R35827 (figs 5, ? 5a), R35828–9 (described only).

9. **Lithodendron concameratum* sp. nov. Lonsdale 1845 : 599–600. 'River Oceter, Government of Tula. Carboniferous limestone.'

10. *Lithodendron fasciculatum* J. Phillips. Lonsdale 1845 : 600. 'River Tchussovaya, west flank of Ural mountains. Carboniferous limestone.' Specimen: R33574 (described only).

11. *Cladocora ? sarmentosa* sp. nov. Lonsdale 1845 : 600–601. 'Kamensk, east of Ekaterinburg. Carboniferous limestone.' Specimens: R49819–20 (described only).

12. *Columnaria sulcata* Goldfuss. Lonsdale 1845 : 601–602; pl. A, figs 1, 1a–1c. 'Habsal, near Reval. Lower Silurian.' Specimen: R33606 (figs 1, 1a–1c).

13. *Lithostrotion emarciatum* (Fischer). Lonsdale 1845 : 603–605, text-figs a–f on p. 603. 'Borovitchi, near Valdai. Carboniferous limestone.' Specimens: R17177 (text-figs a–c), R17178 (text-fig. f), R17180 (text-fig. d); specimen for text-fig. e not known.

14. *Lithostrotion mammillare* (Fischer). Lonsdale 1845 : 606–607, text-figs a, b on p. 606. 'Priksha (Valdai), Government of Novgorod. Carboniferous limestone.' Specimen: R17176 (text-figs a, b).

15. *Lithostrotion astroides* sp. nov. Lonsdale 1845 : 607–608, text-figs a–c on pp. 607–608. 'Pinega (sixty versts west); Carboniferous limestone. Tchussovaya banks, above Ust-Koiva; Carboniferous limestone.' Specimen: R17179 (text-figs a, b, c), Pinega.

16. *Lithostrotion floriforme* Fleming. Lonsdale 1845 : 608–610, text-figs a–c on p. 609. 'Borovitchi, near Valdai. Carboniferous limestone.' Specimen: R49833 (text-figs a–c).

17. **Favosites alveolaris* Goldfuss. Lonsdale 1845 : 610. 'Isle of Dago, Petropavlosk [sic] and Volshanka River (North Ural). Upper Silurian.'

18. **Favosites polymorpha* Goldfuss. Lonsdale 1845 : 610–611. 'Katchukof, on the Upper Belaia and Uziansk Zavod, in the South Ural Chain; Silurian. East of Alatau, South Ural; Devonian ? [sic]. Banks of the lake of Petropavlofsk sixty versts north-west from the Works of Bogoslofsk, North Ural; Upper Silurian ? [sic]'.

19. *Michelinia concinna* sp. nov. Lonsdale 1845 : 611–612; pl. A, figs 3, 3a. 'East of Ust Koiva, on the Tchussovaya. Carboniferous limestone.' Specimen: R33605 (figs 3, ? 3a).

20. *Cyathophyllum turbinatum* Goldfuss. Lonsdale 1845 : 612–613. 'Petropavlofsk, N. Ural. Upper Silurian.' Specimen: R36125 (described only).

21. **Cyathophyllum* (*Tryplasma*) *aequabilis* (subgen. et sp. nov.). Lonsdale 1845 : 613–614; pl. A, figs 7, 7a. 'The river Kakva; East side of the North Ural Mountains; Silurian. Petropavlofsk, northernmost Russo-Uralian mines. Silurian or Devonian ? [sic]'.

22. *Strombodes* sp. Lonsdale 1845 : 614–615; pl. A, fig. 13. 'Ussa River, junction with the Volga near Samara. Upper Carbon[iferous] limestone.' Specimen: R49741 (fig. 13).

23. *Cystiphyllum impunctum* sp. nov. Lonsdale 1845 : 615. 'Margin of the lake of Petropavlofsk, sixty versts north-west from the works of Bogoslofsk. Silurian.' Specimens: R36144–5 (described only).

24. **Caninia* sp. Lonsdale 1845 : 616–617. 'East of Usolie, on the Volga above Samara. Carboniferous limestone.'

25. *Caninia ibicina ?* [sic] (Fischer). Lonsdale 1845 : 617–619; pl. A, figs 6, 6a–6d. 'Velikovo, between Vladimir and Kovrof. Upper Carboniferous limestone.' Specimens: R49743 (fig. 6), R49744 (fig. 6a), R49745 (fig. 6c); specimens for figs 6b and 6d not known.

26. *Stylastraea inconferta* (gen. et sp. nov.). Lonsdale 1845 : 621–622; pl. A, figs 2, 2a–2c. 'Kossatchi-Datchi, south of Miask, eastern side of the Ural Chain. Carboniferous limestone.' Specimen: R17562 (figs 2, 2a–2c).

27. *Diphyphyllum concinnum* (gen. et sp. nov.). Lonsdale 1845 : 624–625; pl. A, figs 4, 4a–4c. 'Hill of Tchirief, Kamensk, on the river Issetz, eastern side of the Ural Chain. Carboniferous limestone.' Specimen: R49740 (figs 4a, 4b, ? 4c; not fig. 4). See below.

28. *Porites pyriformis* Ehrenberg. Lonsdale 1845: 625–626. 'Isle of Dago; Petropavlofsk; Gothland; Malmoe Isle, in Christiania Bay; Upper Silurian.' Specimen: R31192 (described only), Isle of Dago.

29. **Aulopora conglomerata ?* [sic] Goldfuss. Lonsdale 1845 : 626. 'Isle of Dago. Upper Silurian.'

30. **Anthophyllum ? incrustans* [sic] (Phillips). Lonsdale 1845 : 631. 'Ust-Vaga, i.e. *débouchûre* of the Vaga into the Dwina. Permian.'

Systematic description

Class ANTHOZOA

Order RUGOSA

Family LITHOSTROTIONIDAE

Genus *DIPHYPHYLLUM* Lonsdale, 1845

TYPE SPECIES. *Diphyphyllum concinnum* Lonsdale, 1845, by original designation of Lonsdale (1845 : 624); Carboniferous, Urals.

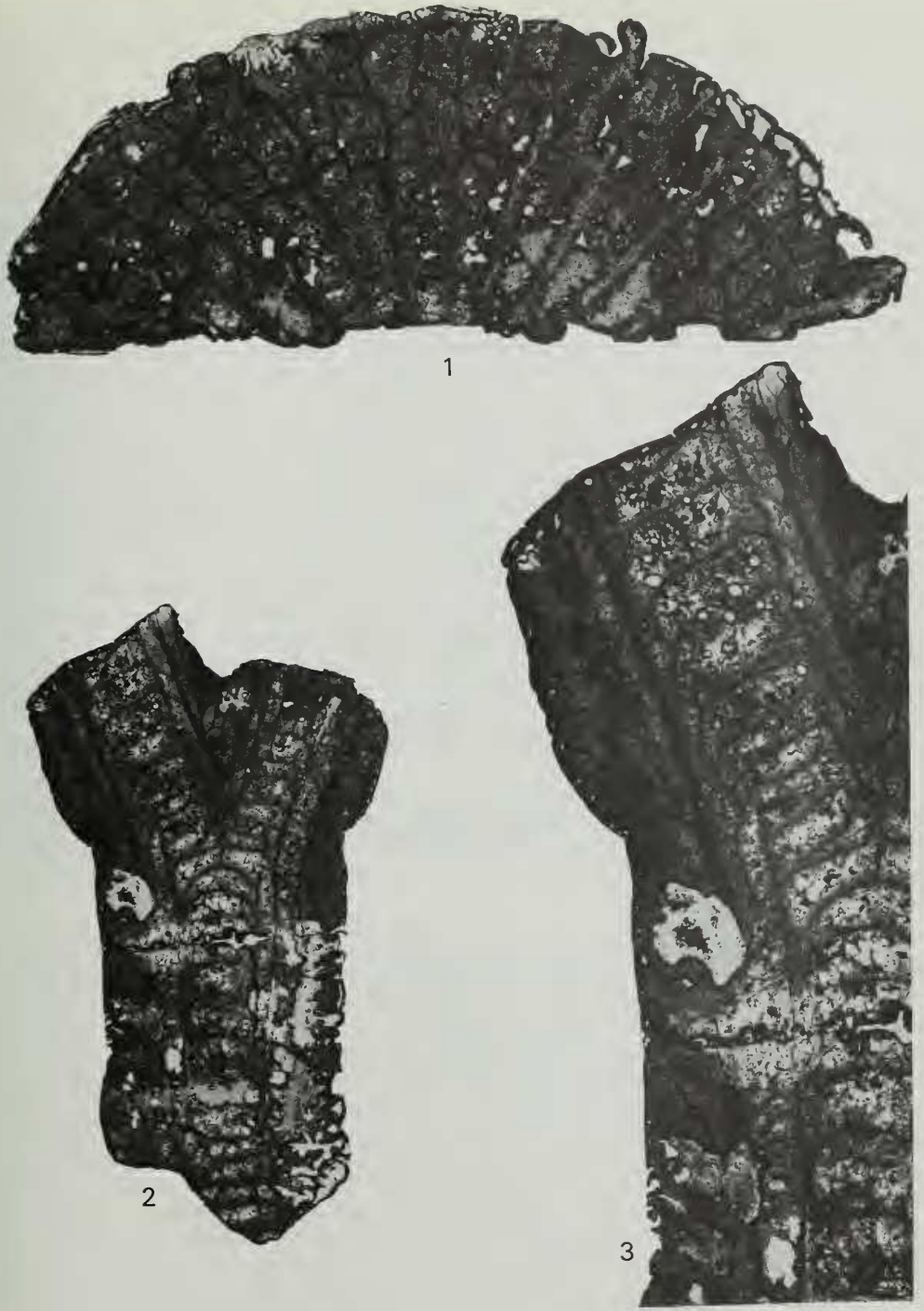
Diphyphyllum concinnum Lonsdale, 1845
(Figs 1–3)

1845 *Diphyphyllum concinnum* Lonsdale : 624; pl. A, figs 4, 4a–c.
non 1876 *Diphyphyllum concinnum* Lonsdale; Thomson & Nicholson : 123; pl. 8, figs 1, 1a [= *D. smithi* Hill].
non 1883 *Diphyphyllum concinnum* Lonsdale; Thomson : 384; pl. 8, fig. 2 [= *D. lateseptatum* McCoy].
non 1887 *Diphyphyllum concinnum* Lonsdale; Thomson : 35; pl. 4, fig. 1 [= *D. lateseptatum* McCoy].
? 1975 *Diphyphyllum concinnum* Lonsdale; [neotypes] Ivanovskiĭ & Shurygina : 17; pl. 2, figs 1a, b.

MATERIAL. One of Lonsdale's syntypes of *D. concinnum*, corresponding to his pl. A, figs 4a, 4b (possibly also 4c, but not his fig. 4). R49470.

LOCALITY. Lonsdale gives the locality as 'Hill of Tchirief [=Chiriev], Kamensk, on the river Issetz [=Iset'], eastern side of the Ural Chain'. Kamensk corresponds to the modern name, Kamensk-Ural'skiy, 56°25′ N, 61°54′ E (U.S. Army 1970). Carboniferous.

HISTORY OF THE TYPE SPECIMENS. Thomson (1887 : 33) appears to have been the last author to have worked with the type specimens of *D. concinnum*, though he did not publish explicit comparisons of his own material with the types. Blake (1902 : 28) listed the *D. concinnum* types, and this represents the most recent previous citation of Lonsdale's material. Unlike most of the other coral specimens from Murchison's Urals collection, listed in the previous section and still extant, Blake's citation shows that it definitely came from the GSL collections rather than the MPG collections. It was found in the BM(NH) in a small collection of unincorporated, unregistered GSL material representing several groups including corals, and including several other type specimens (not of Lonsdale). This collection might have arrived at a later date than the main 1911 transfer (see p. 148), or for some reason was overlooked in the original programme of incorporation which followed this transfer and was then put on one side. By the time Smith (1928) wrote his *Nemistium* paper, the specimen was thought to be lost (1928 : 114). Later authors confirmed this, including Smith & Lang (1930), who perforce recommended that the genus *Diphyphyllum* should be based on another β-form, *D. lateseptatum* (1930 : 180), which



Figs 1–3 *Diphyphyllum concinnum* Lonsdale. Type specimen, R49470. Fig. 1, transverse section, ×16. Fig. 2, longitudinal section, ×4. Fig. 3, detail of longitudinal section, ×8.

they believed to be closely related to *D. concinnum*. (Hill revised Smith's original designation of *D. lateseptatum* as an α-form in her account of the genus (1940 : 181, 184)). The type material of *D. concinnum* had therefore been missing since 1928 at least, and possibly since 1911. Lonsdale actually based his description on several specimens, of which the one corresponding to his pl. A, fig. 4 is still missing. His fig. 4c might be the present specimen, but there is no way of knowing this.

Description. The specimen consists of a single corallite just under 9 mm in width, showing axial division into two corallites. Specimen length 24 mm. The apparently longitudinal section is in fact tangential, though quite close to the axis. Of the original specimen, only the section corresponding to the minor segment is to hand, and full axial details are therefore missing. Preservation is mostly good.

In the incomplete transverse section, eleven major septa are present, alternating with minors. Majors in the tabularium taper very slightly towards the axis, and they also thin marginally in the dissepimentarium to about half their tabularial thickness. Majors reach at least two-thirds of the distance to the inferred axis; minors are between one-third and a half of the length of the majors and project only very slightly beyond the dissepimentarium. Majors slightly zigzag in the tabularium and all septa slightly more so in the dissepimentarium, where there is also a slight tendency for minors to become marginally indistinct and the dissepiments to appear inosculating. The wall is lost. Dissepiments concentric to angular marginally, with innermost dissepiments more regular and smaller in the inner area of the dissepimentarium. The axial region is lost by original section cutting but a few tabular plates are visible in the most axial region.

In longitudinal section, the dissepimentarium is about two-fifths of the corallite radius. There are two marginal rows of larger, nearly horizontal dissepiments within which is an inner row of one or two very much smaller vertical dissepiments. Tabulae are in inner and outer series. Inner tabulae conspicuous, about 10 per cm in the corallite below division; mostly flat, or very slightly arched, outermost parts of each downturned steeply to rest upon the one below. Outer tabulae not conspicuous, mostly horizontal or sloping gently either inwards or outwards. No axial structures can be seen in this section. The septa are clearly seen as amplexoid spines on upper surfaces of tabulae.

Division is axial, 'parricidal'. In longitudinal section, at the point of corallite division, one axial tabula is strongly arched upward, and tabulae below it show an upward trend of increasingly arched form prior to corallite division. The new corallite wall rests directly on the summit of the most arched tabula. The full dissepimentarium structure is established within the new walls almost at the outset.

Inferred Characters. Because of the importance of this specimen, we felt it worthwhile to attempt a reconstruction of the transverse section in order to infer some of the missing information. By extrapolating the septa axially, we found that they mostly converge at a point, which we could then use to generate a complete circular corallite circumference, making a best fit with the fragment outline by eye. This reconstructed diameter is found to be a little more than 9 mm. Using the septal pattern of the existing fragment (Fig. 1) as a template, we found the number of septa we could fit into the reconstructed outline was 52 (majors and minors). For this we assumed a fully radial septal arrangement without strongly bilateral or tetrameral features, as this is both suggested by the existing septa and approximates to the general appearance of many species of *Diphyphyllum* and *Lithostrotion*. On this reconstruction the plane of the existing tangential longitudinal section is found to be 1·25 mm off centre, i.e. it lies about two-thirds the way along the reconstructed radius from the margin. A second reconstruction of the transverse corallite section, made purely geometrically, gives a slightly larger diameter of 10 mm, over 60 major and minor septa, and a position of the plane of the tangential section rather further from the axis, at about five-eighths of the radial distance from the margin. On the basis of both reconstructions the septal number would seem therefore to be between 50 and 65 majors and minors.

The extent to which the septa extend towards the axis cannot be directly reconstructed, but those major septa which lie at right-angles to the plane of the longitudinal cut (Fig. 1) are seen

to stop just short of it. The major septa would therefore have a length of at least two-thirds of the radial distance from the margin. With more material to hand this would probably prove to be variable.

Discussion. The absence of axial details is of course most unfortunate in a type specimen of *Diphyphyllum* and for this reason we have refrained from designating this specimen as the lectotype. Perhaps the remaining type material will be found in due course. Lonsdale (1845) placed great emphasis on the general absence of a columella in his own type descriptions of the present genus and species, whilst he also explained carefully how an intermittent partial columella spine was sometimes present on occasional tabulae in both his type material and numerous similar Bristol specimens. We conclude that a fully reconstructed transverse corallite section of the present specimen would belong with Smith's (1928) *Diphyphyllum* β-group. It would, however, differ from his actual figured example of the β-form (1928 : 115) in having slightly longer septa, a different dissepimentarium and a narrower inner tabularium (than the transverse figure) with rather flatter tabulae. Similar differences separate *D. concinnum* from the β-form *D. lateseptatum*, which Smith & Lang (1930, see p. 150) proposed as a type species for *Diphyphyllum* because the *D. concinnum* types were lost at the time. Differences between *D. concinnum* and *D. lateseptatum* are summarized in Table 1. We especially draw attention to the aulos-like structure, horseshoe-like dissepiments, the shorter and nearly equal minor and major septal length, and the broad inner tabulae in *D. lateseptatum*. The two species are close, however, especially with regard to septal number, transient columella and tabular form.

Table 1 Comparison between *D. lateseptatum* McCoy (in Smith & Lang 1930; Hill 1940) and *D. concinnum*

	Diphyphyllum lateseptatum McCoy	*Diphyphyllum concinnum* Lonsdale
corallite diameter	3–8 mm	9 mm (7–9·5 mm in Lonsdale)
length of major septa	*c.* $\frac{1}{4}$ corallite diameter	*c.* $\frac{1}{3}$ corallite diameter
length of minor septa	*c.* $\frac{1}{3}$ major septa ($\frac{1}{2}$ to equal in Hill)	*c.* $\frac{1}{3}$–$\frac{1}{2}$ major septa
width of dissepimentarium	narrow: *c.* $\frac{1}{8}$	wide: *c.* $\frac{2}{5}$
character of dissepiments	presence of globose, almost horseshoe-like series	horseshoe-like series not present
aulos-like structure	present	not developed
outer tabulae	concave	flat, but may slope either outwards or inwards
inner tabulae	*c.* $\frac{3}{4}$ corallite diameter	*c.* $\frac{1}{3}$ corallite diameter

In view of Dr J. R. Nudd's forthcoming revision of the whole family, we have not made an exhaustive survey of other relevant material, but the most important comparison that must be made here is that with Ivanovskiĭ & Shurygina's *D. concinnum* neotypes. Their vertical sections show a similar dissepimentarium but with a less frequent development of the small vertical innermost dissepiments and a narrower inner tabularium. The outer tabularium differs in being clearly trough-shaped and rather wider. Their transverse sections show a distinct but variable axial feature made up of septal lamellae, the steep sides of the inner tabulae, and even a few elements that look like tabellae. One of their corallites exhibits an axial plate. The major septa, though rarely continuous within the tabularium, frequently converge in the axial region. The authors do not give a full description, but point out that major septa 'sometimes unite in the centre forming an intermittent axial column', a feature which they relate to the development of amplexoid septa. Their figures however suggest that 'sometimes' should really be 'often'. While their figures, like Lonsdale's type, are in Smith's β-group (above), they are actually closer to Smith's (1928) *Nemistium* than they are to *D. concinnum*. Smith regarded *Nemistium* as having β-characteristics and therefore probably being a development of β-stock. The *D. concinnum* neotypes, however, are not conspecific with *N. edmondsi* Smith 1928.

In the absence of axial details in the present specimen these *Nemistium*-like features of the neotypes should be contrasted with Lonsdale's type description, which is completely unambiguous: 'The indications of an axis were very faint, being confined to the occasional appearance of a single line in the centre of the area, or to a few instances of conical irregularities in the diaphragms.' The appearance of such irregularities he relates to the axial division. While Lonsdale's observation obliges the concepts of both the species and genus to embrace an intermittent axial feature, there is as yet no evidence that his species would show quite the development of axial structures seen in Ivanovskiĭ & Shurygina's figures. Even if the differing degree of axial discontinuity is disregarded, the other axial features mentioned above are clearly excluded by Lonsdale's own description.

Perhaps examination of further material will show that the range of variation in Lonsdale's specimens overlaps more convincingly with that in the neotypes or that complete intergradation exists between them. We tried to test this by considering the forms placed in *D. concinnum* Lonsdale by Thomson, who strongly advocated the proper recognition of the genus. Thomson (1887) was evidently the last person to publish coral descriptions based on his having seen the type specimens before they were lost (see p. 150). We follow Hill (1940 : 184), however, in placing Thomson's 1883 and 1887 *D. concinnum* in the synonymy of *D. lateseptatum* McCoy (a different β-group form, as explained by Hill, 1940 : 181). And we believe Thomson & Nicholson's (1876) *D. concinnum* is a good α-form, and belongs with *D. smithi* Hill (1940 : 181).

Pending further studies, therefore, we would maintain that Ivanovskiĭ & Shurygina have provided insufficient evidence that their neotypes are the same species as Lonsdale's type, though we recognize the interest and value in presenting topotypic material. It should be noted that our conclusion is based on Lonsdale's own type descriptions rather than on any new details observed here in the type specimen.

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